

RECEIVED

MAY 10 2002

TECH CENTER 1600/2900



ENTERED

1653

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/686,497

DATE: 05/02/2002 P.6

TIME: 15:58:32

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

```

4 <110> APPLICANT: Selden, Richard F.
5      Miller, Allan M.
6      Treco, Douglas A.
8 <120> TITLE OF INVENTION: OPTIMIZED MESSENGER RNA
10 <130> FILE REFERENCE: 10278-022001
12 <140> CURRENT APPLICATION NUMBER: 09/686,497
13 <141> CURRENT FILING DATE: 2000-10-11
15 <150> PRIOR APPLICATION NUMBER: 09/407,605
16 <151> PRIOR FILING DATE: 1999-09-28
18 <150> PRIOR APPLICATION NUMBER: 60/130,241
19 <151> PRIOR FILING DATE: 1999-04-20
21 <150> PRIOR APPLICATION NUMBER: 60/102,239
22 <151> PRIOR FILING DATE: 1998-09-29
24 <160> NUMBER OF SEQ ID NOS: 138
26 <170> SOFTWARE: FastSEQ for Windows Version 4.0
28 <210> SEQ ID NO: 1
29 <211> LENGTH: 4376
30 <212> TYPE: DNA
31 <213> ORGANISM: Artificial Sequence
33 <220> FEATURE:
34 <221> NAME/KEY: CDS
35 <222> LOCATION: (19)...(4353)
37 <223> OTHER INFORMATION: synthetically generated insert
39 <400> SEQUENCE: 1
40 tagaattcgt aggcctagc atg cag atc gag ctg agc acc tgc ttc ttc ctg      51
41      Met Gln Ile Glu Leu Ser Thr Cys Phe Phe Leu
42      1                      5                      10
44 tgc ctg ctg cgc ttc tgc ttc agc gcc acc cgc cgc tac tac ctg ggc      99
45 Cys Leu Leu Arg Phe Cys Phe Ser Ala Thr Arg Arg Tyr Tyr Leu Gly
46      15                      20                      25
48 gcc gtg gag ctg agc tgg gac tac atg cag agc gac ctg ggc gag ctg      147
49 Ala Val Glu Leu Ser Trp Asp Tyr Met Gln Ser Asp Leu Gly Glu Leu
50      30                      35                      40
52 ccc gtg gac gcc cgc ttc ccc ccc cgc gtg ccc aag agc ttc ccc ttc      195
53 Pro Val Asp Ala Arg Phe Pro Pro Arg Val Pro Lys Ser Phe Pro Phe
54      45                      50                      55
56 aac acc agc gtg gtg tac aag aag acc ctg ttc gtg gag ttc acc gac      243
57 Asn Thr Ser Val Val Tyr Lys Lys Thr Leu Phe Val Glu Phe Thr Asp
58      60                      65                      70                      75
60 cac ctg ttc aac atc gcc aag ccc cgc ccc ccc tgg atg ggc ctg ctg      291
61 His Leu Phe Asn Ile Ala Lys Pro Arg Pro Pro Trp Met Gly Leu Leu
62      80                      85                      90
64 ggc ccc acc atc cag gcc gag gtg tac gac acc gtg gtg atc acc ctg      339

```

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/686,497

DATE: 05/02/2002

TIME: 15:58:32

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 65  | Gly | Pro | Thr | Ile | Gln | Ala | Glu | Val | Tyr | Asp | Thr | Val | Val | Ile | Thr | Leu |      |
| 66  |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |     |     |      |
| 68  | aag | aac | atg | gcc | agc | cac | ccc | gtg | agc | ctg | cac | gcc | gtg | ggc | gtg | agc | 387  |
| 69  | Lys | Asn | Met | Ala | Ser | His | Pro | Val | Ser | Leu | His | Ala | Val | Gly | Val | Ser |      |
| 70  |     |     | 110 |     |     |     |     | 115 |     |     |     |     |     | 120 |     |     |      |
| 72  | tac | tgg | aag | gcc | agc | gag | ggc | gcc | gag | tac | gac | gac | cag | acc | agc | cag | 435  |
| 73  | Tyr | Trp | Lys | Ala | Ser | Glu | Gly | Ala | Glu | Tyr | Asp | Asp | Gln | Thr | Ser | Gln |      |
| 74  |     | 125 |     |     |     |     |     | 130 |     |     |     |     |     | 135 |     |     |      |
| 76  | cgc | gag | aag | gag | gac | gac | aag | gtg | ttc | ccc | ggc | ggc | agc | cac | acc | tac | 483  |
| 77  | Arg | Glu | Lys | Glu | Asp | Asp | Lys | Val | Phe | Pro | Gly | Gly | Ser | His | Thr | Tyr |      |
| 78  | 140 |     |     |     |     | 145 |     |     |     |     | 150 |     |     |     |     | 155 |      |
| 80  | gtg | tgg | cag | gtg | ctg | aag | gag | aac | ggc | ccc | atg | gcc | agc | gac | ccc | ctg | 531  |
| 81  | Val | Trp | Gln | Val | Leu | Lys | Glu | Asn | Gly | Pro | Met | Ala | Ser | Asp | Pro | Leu |      |
| 82  |     |     |     | 160 |     |     |     |     |     | 165 |     |     |     |     | 170 |     |      |
| 84  | tgc | ctg | acc | tac | agc | tac | ctg | agc | cac | gtg | gac | ctg | gtg | aag | gac | ctg | 579  |
| 85  | Cys | Leu | Thr | Tyr | Ser | Tyr | Leu | Ser | His | Val | Asp | Leu | Val | Lys | Asp | Leu |      |
| 86  |     |     |     | 175 |     |     |     |     | 180 |     |     |     |     | 185 |     |     |      |
| 88  | aac | agc | ggc | ctg | atc | ggc | gcc | ctg | ctg | gtg | tgc | cgc | gag | ggc | agc | ctg | 627  |
| 89  | Asn | Ser | Gly | Leu | Ile | Gly | Ala | Leu | Leu | Val | Cys | Arg | Glu | Gly | Ser | Leu |      |
| 90  |     |     | 190 |     |     |     |     | 195 |     |     |     |     |     | 200 |     |     |      |
| 92  | gcc | aag | gag | aag | acc | cag | acc | ctg | cac | aag | ttc | atc | ctg | ctg | ttc | gcc | 675  |
| 93  | Ala | Lys | Glu | Lys | Thr | Gln | Thr | Leu | His | Lys | Phe | Ile | Leu | Leu | Phe | Ala |      |
| 94  |     | 205 |     |     |     | 210 |     |     |     |     | 215 |     |     |     |     |     |      |
| 96  | gtg | ttc | gac | gag | ggc | aag | agc | tgg | cac | agc | gag | acc | aag | aac | agc | ctg | 723  |
| 97  | Val | Phe | Asp | Glu | Gly | Lys | Ser | Trp | His | Ser | Glu | Thr | Lys | Asn | Ser | Leu |      |
| 98  | 220 |     |     |     |     | 225 |     |     |     |     | 230 |     |     |     | 235 |     |      |
| 100 | atg | cag | gac | cgc | gac | gcc | gcc | agc | gcc | cgc | gcc | tgg | ccc | aag | atg | cac | 771  |
| 101 | Met | Gln | Asp | Arg | Asp | Ala | Ala | Ser | Ala | Arg | Ala | Trp | Pro | Lys | Met | His |      |
| 102 |     |     |     | 240 |     |     |     |     |     | 245 |     |     |     |     | 250 |     |      |
| 104 | acc | gtg | aac | ggc | tac | gtg | aac | cgc | agc | ctg | ccc | ggc | ctg | atc | ggc | tgc | 819  |
| 105 | Thr | Val | Asn | Gly | Tyr | Val | Asn | Arg | Ser | Leu | Pro | Gly | Leu | Ile | Gly | Cys |      |
| 106 |     |     |     | 255 |     |     |     |     | 260 |     |     |     |     | 265 |     |     |      |
| 108 | cac | cgc | aag | agc | gtg | tac | tgg | cac | gtg | atc | ggc | atg | ggc | acc | acc | ccc | 867  |
| 109 | His | Arg | Lys | Ser | Val | Tyr | Trp | His | Val | Ile | Gly | Met | Gly | Thr | Thr | Pro |      |
| 110 |     |     | 270 |     |     |     |     | 275 |     |     |     |     | 280 |     |     |     |      |
| 112 | gag | gtg | cac | agc | atc | ttc | ctg | gag | ggc | cac | acc | ttc | ctg | gtg | cgc | aac | 915  |
| 113 | Glu | Val | His | Ser | Ile | Phe | Leu | Glu | Gly | His | Thr | Phe | Leu | Val | Arg | Asn |      |
| 114 |     | 285 |     |     |     |     | 290 |     |     |     |     | 295 |     |     |     |     |      |
| 116 | cac | cgc | cag | gcc | agc | ctg | gag | atc | agc | ccc | atc | acc | ttc | ctg | acc | gcc | 963  |
| 117 | His | Arg | Gln | Ala | Ser | Leu | Glu | Ile | Ser | Pro | Ile | Thr | Phe | Leu | Thr | Ala |      |
| 118 | 300 |     |     |     |     | 305 |     |     |     |     | 310 |     |     |     | 315 |     |      |
| 120 | cag | acc | ctg | ctg | atg | gac | ctg | ggc | cag | ttc | ctg | ctg | ttc | tgc | cac | atc | 1011 |
| 121 | Gln | Thr | Leu | Leu | Met | Asp | Leu | Gly | Gln | Phe | Leu | Leu | Phe | Cys | His | Ile |      |
| 122 |     |     |     | 320 |     |     |     |     |     | 325 |     |     |     |     | 330 |     |      |
| 124 | agc | agc | cac | cag | cac | gac | ggc | atg | gag | gcc | tac | gtg | aag | gtg | gac | agc | 1059 |
| 125 | Ser | Ser | His | Gln | His | Asp | Gly | Met | Glu | Ala | Tyr | Val | Lys | Val | Asp | Ser |      |
| 126 |     |     | 335 |     |     |     |     |     | 340 |     |     |     |     | 345 |     |     |      |
| 128 | tgc | ccc | gag | gag | ccc | cag | ctg | cgc | atg | aag | aac | aac | gag | gag | gcc | gag | 1107 |
| 129 | Cys | Pro | Glu | Glu | Pro | Gln | Leu | Arg | Met | Lys | Asn | Asn | Glu | Glu | Ala | Glu |      |

## RAW SEQUENCE LISTING

DATE: 05/02/2002

PATENT APPLICATION: US/09/686,497

TIME: 15:58:32

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

|     |   |     |     |      |
|-----|---|-----|-----|------|
| 130 | 350   | 355 | 360 |      |
| 132 | gac tac gac gac gac ctg acc gac agc gag atg gac gtg gtg cgc ttc |     |     | 1155 |
| 133 | Asp Tyr Asp Asp Asp Leu Thr Asp Ser Glu Met Asp Val Val Arg Phe |     |     |      |
| 134 | 365   | 370 | 375 |      |
| 136 | gac gac gac aac agc ccc agc ttc atc cag atc cgc agc gtg gcc aag |     |     | 1203 |
| 137 | Asp Asp Asp Asn Ser Pro Ser Phe Ile Gln Ile Arg Ser Val Ala Lys |     |     |      |
| 138 | 380   | 385 | 390 | 395  |
| 140 | aag cac ccc aag acc tgg gtg cac tac atc gcc gcc gag gag gag gac |     |     | 1251 |
| 141 | Lys His Pro Lys Thr Trp Val His Tyr Ile Ala Ala Glu Glu Glu Asp |     |     |      |
| 142 | 400   | 405 | 410 |      |
| 144 | tgg gac tac gcc ccc ctg gtg ctg gcc ccc gac gac cgc agc tac aag |     |     | 1299 |
| 145 | Trp Asp Tyr Ala Pro Leu Val Leu Ala Pro Asp Asp Arg Ser Tyr Lys |     |     |      |
| 146 | 415   | 420 | 425 |      |
| 148 | agc cag tac ctg aac aac ggc ccc cag cgc atc ggc cgc aag tac aag |     |     | 1347 |
| 149 | Ser Gln Tyr Leu Asn Asn Gly Pro Gln Arg Ile Gly Arg Lys Tyr Lys |     |     |      |
| 150 | 430   | 435 | 440 |      |
| 152 | aag gtg cgc ttc atg gcc tac acc gac gag acc ttc aag acc cgc gag |     |     | 1395 |
| 153 | Lys Val Arg Phe Met Ala Tyr Thr Asp Glu Thr Phe Lys Thr Arg Glu |     |     |      |
| 154 | 445   | 450 | 455 |      |
| 156 | gcc atc cag cac gag agc ggc atc ctg ggc ccc ctg ctg tac ggc gag |     |     | 1443 |
| 157 | Ala Ile Gln His Glu Ser Gly Ile Leu Gly Pro Leu Leu Tyr Gly Glu |     |     |      |
| 158 | 460   | 465 | 470 | 475  |
| 160 | gtg ggc gac acc ctg ctg atc atc ttc aag aac cag gcc agc cgc ccc |     |     | 1491 |
| 161 | Val Gly Asp Thr Leu Leu Ile Ile Phe Lys Asn Gln Ala Ser Arg Pro |     |     |      |
| 162 | 480   | 485 | 490 |      |
| 164 | tac aac atc tac ccc cac ggc atc acc gac gtg cgc ccc ctg tac agc |     |     | 1539 |
| 165 | Tyr Asn Ile Tyr Pro His Gly Ile Thr Asp Val Arg Pro Leu Tyr Ser |     |     |      |
| 166 | 495   | 500 | 505 |      |
| 168 | cgc cgc ctg ccc aag ggc gtg aag cac ctg aag gac ttc ccc atc ctg |     |     | 1587 |
| 169 | Arg Arg Leu Pro Lys Gly Val Lys His Leu Lys Asp Phe Pro Ile Leu |     |     |      |
| 170 | 510   | 515 | 520 |      |
| 172 | ccc ggc gag atc ttc aag tac aag tgg acc gtg acc gtg gag gac ggc |     |     | 1635 |
| 173 | Pro Gly Glu Ile Phe Lys Tyr Lys Trp Thr Val Thr Val Glu Asp Gly |     |     |      |
| 174 | 525   | 530 | 535 |      |
| 176 | ccc acc aag agc gac ccc cgc tgc ctg acc cgc tac tac agc agc ttc |     |     | 1683 |
| 177 | Pro Thr Lys Ser Asp Pro Arg Cys Leu Thr Arg Tyr Tyr Ser Ser Phe |     |     |      |
| 178 | 540   | 545 | 550 | 555  |
| 180 | gtg aac atg gag cgc gac ctg gcc agc ggc ctg atc ggc ccc ctg ctg |     |     | 1731 |
| 181 | Val Asn Met Glu Arg Asp Leu Ala Ser Gly Leu Ile Gly Pro Leu Leu |     |     |      |
| 182 | 560   | 565 | 570 |      |
| 184 | atc tgc tac aag gag agc gtg gac cag cgc ggc aac cag atc atg agc |     |     | 1779 |
| 185 | Ile Cys Tyr Lys Glu Ser Val Asp Gln Arg Gly Asn Gln Ile Met Ser |     |     |      |
| 186 | 575   | 580 | 585 |      |
| 188 | gac aag cgc aac gtg atc ctg ttc agc gtg ttc gac gag aac cgc agc |     |     | 1827 |
| 189 | Asp Lys Arg Asn Val Ile Leu Phe Ser Val Phe Asp Glu Asn Arg Ser |     |     |      |
| 190 | 590   | 595 | 600 |      |
| 192 | tgg tac ctg acc gag aac atc cag cgc ttc ctg ccc aac ccc gcc ggc |     |     | 1875 |
| 193 | Trp Tyr Leu Thr Glu Asn Ile Gln Arg Phe Leu Pro Asn Pro Ala Gly |     |     |      |
| 194 | 605   | 610 | 615 |      |

## RAW SEQUENCE LISTING

DATE: 05/02/2002

PATENT APPLICATION: US/09/686,497

TIME: 15:58:32

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 196 | gtg | cag | ctg | gag | gac | ccc | gag | ttc | cag | gcc | agc | aac | atc | atg | cac | agc | 1923 |
| 197 | Val | Gln | Leu | Glu | Asp | Pro | Glu | Phe | Gln | Ala | Ser | Asn | Ile | Met | His | Ser |      |
| 198 | 620 |     |     |     |     | 625 |     |     |     |     | 630 |     |     |     |     | 635 |      |
| 200 | atc | aac | ggc | tac | gtg | ttc | gac | agc | ctg | cag | ctg | agc | gtg | tgc | ctg | cac | 1971 |
| 201 | Ile | Asn | Gly | Tyr | Val | Phe | Asp | Ser | Leu | Gln | Leu | Ser | Val | Cys | Leu | His |      |
| 202 |     |     |     |     | 640 |     |     |     |     |     | 645 |     |     |     |     | 650 |      |
| 204 | gag | gtg | gcc | tac | tgg | tac | atc | ctg | agc | atc | ggc | gcc | cag | acc | gac | ttc | 2019 |
| 205 | Glu | Val | Ala | Tyr | Trp | Tyr | Ile | Leu | Ser | Ile | Gly | Ala | Gln | Thr | Asp | Phe |      |
| 206 |     |     |     |     | 655 |     |     |     |     | 660 |     |     |     |     |     | 665 |      |
| 208 | ctg | agc | gtg | ttc | ttc | agc | ggc | tac | acc | ttc | aag | cac | aag | atg | gtg | tac | 2067 |
| 209 | Leu | Ser | Val | Phe | Phe | Ser | Gly | Tyr | Thr | Phe | Lys | His | Lys | Met | Val | Tyr |      |
| 210 |     |     | 670 |     |     |     |     | 675 |     |     |     |     |     | 680 |     |     |      |
| 212 | gag | gac | acc | ctg | acc | ctg | ttc | ccc | ttc | agc | ggc | gag | acc | gtg | ttc | atg | 2115 |
| 213 | Glu | Asp | Thr | Leu | Thr | Leu | Phe | Pro | Phe | Ser | Gly | Glu | Thr | Val | Phe | Met |      |
| 214 |     |     | 685 |     |     |     |     | 690 |     |     |     |     |     | 695 |     |     |      |
| 216 | agc | atg | gag | aac | ccc | ggc | ctg | tgg | atc | ctg | ggc | tgc | cac | aac | agc | gac | 2163 |
| 217 | Ser | Met | Glu | Asn | Pro | Gly | Leu | Trp | Ile | Leu | Gly | Cys | His | Asn | Ser | Asp |      |
| 218 | 700 |     |     |     |     | 705 |     |     |     |     | 710 |     |     |     |     | 715 |      |
| 220 | ttc | cgc | aac | cgc | ggc | atg | acc | gcc | ctg | ctg | aag | gtg | agc | agc | tgc | gac | 2211 |
| 221 | Phe | Arg | Asn | Arg | Gly | Met | Thr | Ala | Leu | Leu | Lys | Val | Ser | Ser | Cys | Asp |      |
| 222 |     |     |     |     | 720 |     |     |     |     |     | 725 |     |     |     |     | 730 |      |
| 224 | aag | aac | acc | ggc | gac | tac | tac | gag | gac | agc | tac | gag | gac | atc | agc | gcc | 2259 |
| 225 | Lys | Asn | Thr | Gly | Asp | Tyr | Tyr | Glu | Asp | Ser | Tyr | Glu | Asp | Ile | Ser | Ala |      |
| 226 |     |     |     | 735 |     |     |     |     |     | 740 |     |     |     |     |     | 745 |      |
| 228 | tac | ctg | ctg | agc | aag | aac | aac | gcc | atc | gag | ccc | cgc | ctg | gag | gag | atc | 2307 |
| 229 | Tyr | Leu | Leu | Ser | Lys | Asn | Asn | Ala | Ile | Glu | Pro | Arg | Leu | Glu | Glu | Ile |      |
| 230 |     |     |     | 750 |     |     |     |     |     | 755 |     |     |     |     |     | 760 |      |
| 232 | acc | cgc | acc | acc | ctg | cag | agc | gac | cag | gag | gag | atc | gac | tac | gac | gac | 2355 |
| 233 | Thr | Arg | Thr | Thr | Leu | Gln | Ser | Asp | Gln | Glu | Glu | Ile | Asp | Tyr | Asp | Asp |      |
| 234 |     |     |     | 765 |     |     |     | 770 |     |     |     |     |     |     |     | 775 |      |
| 236 | acc | atc | agc | gtg | gag | atg | aag | aag | gag | gac | ttc | gac | atc | tac | gac | gag | 2403 |
| 237 | Thr | Ile | Ser | Val | Glu | Met | Lys | Lys | Glu | Asp | Phe | Asp | Ile | Tyr | Asp | Glu |      |
| 238 | 780 |     |     |     |     | 785 |     |     |     |     | 790 |     |     |     |     | 795 |      |
| 240 | gac | gag | aac | cag | agc | ccc | cgc | agc | ttc | cag | aag | aag | acc | cgc | cac | tac | 2451 |
| 241 | Asp | Glu | Asn | Gln | Ser | Pro | Arg | Ser | Phe | Gln | Lys | Lys | Thr | Arg | His | Tyr |      |
| 242 |     |     |     |     | 800 |     |     |     |     |     | 805 |     |     |     |     | 810 |      |
| 244 | ttc | atc | gcc | gcc | gtg | gag | cgc | ctg | tgg | gac | tac | ggc | atg | agc | agc | agc | 2499 |
| 245 | Phe | Ile | Ala | Ala | Val | Glu | Arg | Leu | Trp | Asp | Tyr | Gly | Met | Ser | Ser | Ser |      |
| 246 |     |     |     |     | 815 |     |     |     |     |     | 820 |     |     |     |     | 825 |      |
| 248 | ccc | cac | gtg | ctg | cgc | aac | cgc | gcc | cag | agc | ggc | agc | gtg | ccc | cag | ttc | 2547 |
| 249 | Pro | His | Val | Leu | Arg | Asn | Arg | Ala | Gln | Ser | Gly | Ser | Val | Pro | Gln | Phe |      |
| 250 |     |     |     | 830 |     |     |     |     |     | 835 |     |     |     |     |     | 840 |      |
| 252 | aag | aag | gtg | gtg | ttc | cag | gag | ttc | acc | gac | ggc | agc | ttc | acc | cag | ccc | 2595 |
| 253 | Lys | Lys | Val | Val | Phe | Gln | Glu | Phe | Thr | Asp | Gly | Ser | Phe | Thr | Gln | Pro |      |
| 254 |     |     |     |     | 845 |     |     |     |     |     | 850 |     |     |     |     | 855 |      |
| 256 | ctg | tac | cgc | ggc | gag | ctg | aac | gag | cac | ctg | ggc | ctg | ctg | ggc | ccc | tac | 2643 |
| 257 | Leu | Tyr | Arg | Gly | Glu | Leu | Asn | Glu | His | Leu | Gly | Leu | Leu | Gly | Pro | Tyr |      |
| 258 | 860 |     |     |     |     | 865 |     |     |     |     | 870 |     |     |     |     | 875 |      |
| 260 | atc | cgc | gcc | gag | gtg | gag | gac | aac | atc | atg | gtg | acc | ttc | cgc | aac | cag | 2691 |

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/686,497

DATE: 05/02/2002

TIME: 15:58:32

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

|     |      |      |      |      |      |     |      |      |      |      |     |     |      |     |      |     |      |
|-----|------|------|------|------|------|-----|------|------|------|------|-----|-----|------|-----|------|-----|------|
| 261 | Ile  | Arg  | Ala  | Glu  | Val  | Glu | Asp  | Asn  | Ile  | Met  | Val | Thr | Phe  | Arg | Asn  | Gln |      |
| 262 |      |      |      |      | 880  |     |      |      |      | 885  |     |     |      |     | 890  |     |      |
| 264 | gcc  | agc  | cgc  | ccc  | tac  | agc | ttc  | tac  | agc  | agc  | ctg | atc | agc  | tac | gag  | gag | 2739 |
| 265 | Ala  | Ser  | Arg  | Pro  | Tyr  | Ser | Phe  | Tyr  | Ser  | Ser  | Leu | Ile | Ser  | Tyr | Glu  | Glu |      |
| 266 |      |      |      | 895  |      |     |      |      | 900  |      |     |     |      |     | 905  |     |      |
| 268 | gac  | cag  | cgc  | cag  | ggc  | gcc | gag  | ccc  | cgc  | aag  | aac | ttc | gtg  | aag | ccc  | aac | 2787 |
| 269 | Asp  | Gln  | Arg  | Gln  | Gly  | Ala | Glu  | Pro  | Arg  | Lys  | Asn | Phe | Val  | Lys | Pro  | Asn |      |
| 270 |      |      |      | 910  |      |     |      | 915  |      |      |     |     | 920  |     |      |     |      |
| 272 | gag  | acc  | aag  | acc  | tac  | ttc | tgg  | aag  | gtg  | cag  | cac | cac | atg  | gcc | ccc  | acc | 2835 |
| 273 | Glu  | Thr  | Lys  | Thr  | Tyr  | Phe | Trp  | Lys  | Val  | Gln  | His | His | Met  | Ala | Pro  | Thr |      |
| 274 |      | 925  |      |      |      |     | 930  |      |      |      |     |     | 935  |     |      |     |      |
| 276 | aag  | gac  | gag  | ttc  | gac  | tgc | aag  | gcc  | tgg  | gcc  | tac | ttc | agc  | gac | gtg  | gac | 2883 |
| 277 | Lys  | Asp  | Glu  | Phe  | Asp  | Cys | Lys  | Ala  | Trp  | Ala  | Tyr | Phe | Ser  | Asp | Val  | Asp |      |
| 278 | 940  |      |      |      | 945  |     |      |      |      | 950  |     |     |      |     |      | 955 |      |
| 280 | ctg  | gag  | aag  | gac  | gtg  | cac | agc  | ggc  | ctg  | atc  | ggg | ccc | ctg  | ctg | gtg  | tgc | 2931 |
| 281 | Leu  | Glu  | Lys  | Asp  | Val  | His | Ser  | Gly  | Leu  | Ile  | Gly | Pro | Leu  | Leu | Val  | Cys |      |
| 282 |      |      |      | 960  |      |     |      |      | 965  |      |     |     |      |     | 970  |     |      |
| 284 | cac  | acc  | aac  | acc  | ctg  | aac | ccc  | gcc  | cac  | ggc  | cgc | cag | gtg  | acc | gtg  | cag | 2979 |
| 285 | His  | Thr  | Asn  | Thr  | Leu  | Asn | Pro  | Ala  | His  | Gly  | Arg | Gln | Val  | Thr | Val  | Gln |      |
| 286 |      |      |      | 975  |      |     |      |      | 980  |      |     |     |      |     | 985  |     |      |
| 288 | gag  | ttc  | gcc  | ctg  | ttc  | ttc | acc  | atc  | ttc  | gac  | gag | acc | aag  | agc | tgg  | tac | 3027 |
| 289 | Glu  | Phe  | Ala  | Leu  | Phe  | Phe | Thr  | Ile  | Phe  | Asp  | Glu | Thr | Lys  | Ser | Trp  | Tyr |      |
| 290 |      | 990  |      |      |      |     |      | 995  |      |      |     |     | 1000 |     |      |     |      |
| 292 | ttc  | acc  | gag  | aac  | atg  | gag | cgc  | aac  | tgc  | cgc  | gcc | ccc | tgc  | aac | atc  | cag | 3075 |
| 293 | Phe  | Thr  | Glu  | Asn  | Met  | Glu | Arg  | Asn  | Cys  | Arg  | Ala | Pro | Cys  | Asn | Ile  | Gln |      |
| 294 |      | 1005 |      |      |      |     | 1010 |      |      |      |     |     | 1015 |     |      |     |      |
| 296 | atg  | gag  | gac  | ccc  | acc  | ttc | aag  | gag  | aac  | tac  | cgc | ttc | cac  | gcc | atc  | aac | 3123 |
| 297 | Met  | Glu  | Asp  | Pro  | Thr  | Phe | Lys  | Glu  | Asn  | Tyr  | Arg | Phe | His  | Ala | Ile  | Asn |      |
| 298 | 1020 |      |      |      | 1025 |     |      |      |      | 1030 |     |     |      |     | 1035 |     |      |
| 300 | ggc  | tac  | atc  | atg  | gac  | acc | ctg  | aaa  | ggc  | ctg  | gtg | atg | gcc  | cag | gac  | cag | 3171 |
| 301 | Gly  | Tyr  | Ile  | Met  | Asp  | Thr | Leu  | Lys  | Gly  | Leu  | Val | Met | Ala  | Gln | Asp  | Gln |      |
| 302 |      |      |      | 1040 |      |     |      |      |      | 1045 |     |     |      |     | 1050 |     |      |
| 304 | cgc  | atc  | cgc  | tgg  | tac  | ctg | ctg  | agc  | atg  | ggc  | agc | aac | gag  | aac | atc  | cac | 3219 |
| 305 | Arg  | Ile  | Arg  | Trp  | Tyr  | Leu | Leu  | Ser  | Met  | Gly  | Ser | Asn | Glu  | Asn | Ile  | His |      |
| 306 |      |      |      | 1055 |      |     |      |      | 1060 |      |     |     |      |     | 1065 |     |      |
| 308 | agc  | atc  | cac  | ttc  | agc  | ggc | cac  | gtg  | ttc  | acc  | gtg | cgc | aag  | aag | gag  | gag | 3267 |
| 309 | Ser  | Ile  | His  | Phe  | Ser  | Gly | His  | Val  | Phe  | Thr  | Val | Arg | Lys  | Lys | Glu  | Glu |      |
| 310 |      |      | 1070 |      |      |     |      | 1075 |      |      |     |     | 1080 |     |      |     |      |
| 312 | tac  | aag  | atg  | gcc  | ctg  | tac | aac  | ctg  | tac  | ccc  | ggc | gtg | ttc  | gag | acc  | gtg | 3315 |
| 313 | Tyr  | Lys  | Met  | Ala  | Leu  | Tyr | Asn  | Leu  | Tyr  | Pro  | Gly | Val | Phe  | Glu | Thr  | Val |      |
| 314 |      | 1085 |      |      |      |     | 1090 |      |      |      |     |     | 1095 |     |      |     |      |
| 316 | gag  | atg  | ctg  | ccc  | agc  | aag | gcc  | ggc  | atc  | tgg  | cgc | gtg | gag  | tgc | ctg  | atc | 3363 |
| 317 | Glu  | Met  | Leu  | Pro  | Ser  | Lys | Ala  | Gly  | Ile  | Trp  | Arg | Val | Glu  | Cys | Leu  | Ile |      |
| 318 | 1100 |      |      |      | 1105 |     |      |      |      | 1110 |     |     |      |     | 1115 |     |      |
| 320 | ggc  | gag  | cac  | ctg  | cac  | gcc | ggc  | atg  | agc  | acc  | ctg | ttc | ctg  | gtg | tac  | agc | 3411 |
| 321 | Gly  | Glu  | His  | Leu  | His  | Ala | Gly  | Met  | Ser  | Thr  | Leu | Phe | Leu  | Val | Tyr  | Ser |      |
| 322 |      |      |      | 1120 |      |     |      |      |      | 1125 |     |     |      |     | 1130 |     |      |
| 324 | aac  | aag  | tgc  | cag  | acc  | ccc | ctg  | ggc  | atg  | gcc  | agc | ggc | cac  | atc | cgc  | gac | 3459 |
| 325 | Asn  | Lys  | Cys  | Gln  | Thr  | Pro | Leu  | Gly  | Met  | Ala  | Ser | Gly | His  | Ile | Arg  | Asp |      |

RAW SEQUENCE LISTING ERROR SUMMARY  
PATENT APPLICATION: US/09/686,497

DATE: 05/02/2002  
TIME: 15:58:33

Input Set : A:\10278-022001.TXT  
Output Set: N:\CRF3\05022002\I686497.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:5; N Pos. 7,8,9,10,11,12,13,14,15,16

Seq#:6; N Pos. 7,8,9,10,11,12,13,14,15,16

## VERIFICATION SUMMARY

DATE: 05/02/2002

PATENT APPLICATION: US/09/686,497

TIME: 15:58:33

Input Set : A:\10278-022001.TXT

Output Set: N:\CRF3\05022002\I686497.raw

L:414 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:417 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:2  
L:1176 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:1180 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:5  
L:1181 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:0  
L:1191 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:1195 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:6  
L:1196 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:0